REMARKS

By this Amendment, claims 1, 6, 9 and 11-17 have been amended, and new claim 39 has been added. Claims 1-39 are pending in the application. Claims 2-4 and 22-38 have been withdrawn from consideration as being drawn to non-elected subject matter. The specification has been amended to address minor informalities, as well as points discussed below. Reconsideration of the May 17, 2004 Official Action is respectfully requested in light of the above amendments and the following remarks.

Telephone Interview

Applicants thank Examiner Lopez for the courtesies extended to Applicants' undersigned representative during the August 6, 2004 telephone conference. The substance of the interview is incorporated in the following remarks.

Allowable Subject Matter

Applicants gratefully acknowledge the indication in the Official Action that claims 5, 7, 13, 16, 17 and 21 contain allowable subject matter. For reasons stated below, however, Applicants respectfully submit that the remaining elected claims are also patentable.

Information Disclosure Statement

The Office Action states that the publication by Jens Schulze et al. entitled "Compact self-aligning assemblies with refractive microlens arrays made by contactless embossing," which was cited on the Form PTO-1449 accompanying the

Information Disclosure Statement filed on October 30, 2001, has not been considered because its date of publication was not provided. Applicants have attached a copy of this publication (along with information providing its publication date) and a Form PTO-1449 citing the publication. It is respectfully requested that Applicants be provided with an Examiner-initialed copy of the attached Form PTO-1449 with the next Patent Office communication.

Objections to Specification

The specification has been amended to address the objections under 37 CFR § 1.75(d)(1). No new matter has been added by the amendments. See MPEP § 2163.06(III). Withdrawal of the objections is respectfully requested.

Rejection Under 35 U.S.C. §112, First Paragraph

Claim 9 stands rejected under 35 U.S.C. §112, first paragraph, for the reasons stated on page 3 of the Official Action.

Claim 9 has been amended to recite that "a carbon layer, a diamond layer or a diamond-like layer is used as the parting layer." A "diamond-like" layer is a diamond-like carbon layer that has diamond-like structural characteristics. The term "diamond-like carbon" is used in the art of microlens manufacturing, as described, for example, in U.S. Patent No. 6,305,194 to Budinski et al. (see column 7, lines 26-28), which is discussed in greater detail below.

As explained at MPEP § 2164.01, "the test for enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation."

Applicants submit that a diamond layer or a diamond-like layer can be destroyed under process temperatures of over 500°C, thereby allowing the claimed first and second substrates to be parted. Applicants submit that one skilled in the art would be able to destroy a diamond layer or a diamond-like layer using such thermal action in light of the present disclosure coupled with information known in the art without having to conduct "undue experimentation."

Also, the Office Action has not established a reasonable basis to question the enablement provided for the subject matter recited in claim 9, as is required under the provisions of MPEP § 2164.04. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §112, first paragraph be withdrawn.

Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 6-9, 12, 17 and 18 stand rejected under 35 U.S.C. §112, second paragraph, for the reasons stated on page 3-4 of the Official Action.

Claim 6 has been amended to recite "said first and second substrates."

Regarding claim 9, as explained above, the term "diamond-type" has been changed to "diamond-like." Applicants respectfully submit that one having ordinary skill in the art would understand the meaning of the term "diamond-like."

In claim 12, the term "Pyrex® glass" has been deleted and replaced by a typical chemical composition of this material. Applicants have attached publicly-available information regarding Pyrex® borosilicate glass, which provides a typical chemical composition at page 1. Applicants respectfully submit that the amendments to claim 12 do not introduce new matter.

Claim 17 has been amended to recite "at least one of pressure."

The term "glass-type material" has been changed in claims 1, 11 and 13-17 to "glass." Support for this amendment is provided, for example, at page 3, line 18, of the specification. The recitation of "a second substrate of glass" in claim 1 provides antecedent basis for the term "said glass substrate" in claim 18.

Applicants respectfully submit that claims 6-9, 12, 17 and 18 comply with the provisions of 35 U.S.C. § 112, second paragraph. Therefore, withdrawal of the rejection is respectfully requested.

First Rejection Under 35 U.S.C. §102

Claims 1 and 10 stand rejected under 35 U.S.C. §102(b) over U.S. Patent No. 3, 221,654 to Jernt ("Jernt"). The reasons for the rejection are stated on pages 5-6 of the Official Action. The rejection is respectfully traversed.

Claim 1, as amended, recites "a method of structuring surfaces of micro-mechanical and/or micro-optical components and/or functional elements of glass-type materials, comprising: structuring at least one surface of a first substrate in order to obtain recesses on the at least one surface; joining said first substrate to a second substrate of glass, with the structured surface of said first substrate being joined to a surface of said second substrate of glass in an at least partly overlapping relationship; annealing the joined first and second substrates in such a way that said glass flows into the recesses of said structured surface of said first substrate, structuring a side of said second substrate which faces said first substrate; and separating said second substrate from said first substrate" (emphasis added). The recited glass is an inorganic material that can, in embodiments, have a melting temperature between about 600°C and 800°C. See, for example, page 6, last

paragraph of the specification. Glass can also provide similar physical properties as compared to the material of the first substrate. Jernt fails to disclose the method recited in claim 1.

Jernt discloses a method of manufacturing a plastic printing plate. In Jernt's method, a plastic sheet 24 is mounted on a porous matrix and heated to cause flow of the plastic sheet, as shown in Figures 4 and 5. Jernt does not disclose at least the features of "joining said first substrate to a second substrate of glass, with the structured surface of said first substrate being joined to a surface of said second substrate of glass in an at least partly overlapping relationship; annealing the joined first and second substrates in such a way that said glass flows into the recesses of said structured surface of said first substrate," as recited in claim 1. Accordingly, claim 1 is patentable over Jernt. Dependent claim 10 is thus also patentable over Jernt.

Therefore, withdrawal of the rejection is respectfully requested.

Second Rejection Under 35 U.S.C. §102

Claims 1, 10, 11, 14 and 15 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,256,149 to Rolfe ("Rolfe"). The reasons for the rejection are stated on pages 6-8 of the Official Action. The rejection is respectfully traversed.

Rolfe discloses a method of making a lenticular lens sheet. The Office Action refers to Figure 2, which shows a molding sheet 12 disposed over a platen 28 having grooves 30. Rolfe discloses that the sheet 12 is preferably of thermoplastics, and fails to disclose that the sheet is of glass. Accordingly, Rolfe does not disclose at least the features of "joining said first substrate to a second substrate of glass, with

the structured surface of said first substrate being joined to a surface of said second substrate of glass in an at least partly overlapping relationship; annealing the joined first and second substrates in such a way that said glass flows into the recesses of said structured surface of said first substrate," as recited in claim 1. Accordingly, claim 1 is patentable over Rolfe. Dependent claims 10, 11, 14 and 15 are thus also patentable over Rolfe.

Therefore, withdrawal of the rejection is respectfully requested.

Third Rejection Under 35 U.S.C. §102

Claims 1, 6, 8-9, 11-12, 15 and 19-20 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,305,194 to Budinski et al. ("Budinski"). The reasons for the rejection are stated on pages 7-8 of the Official Action. The rejection is respectfully traversed.

As was discussed during the telephone interview, Budinski discloses a compression molding method. As shown in Figure 5, for example, a glass preform 114 is placed on a lower mold half 104 and an upper mold half 102 is positioned above the glass preform 114 and the lower mold half 104. As explained at column 4, lines 38-42 of Budinski, the preform 114, the upper mold half 102 and the lower mold half 104 are heated to at least the glass transition temperature of the preform 114. To the extent that the preform 114 is a "second substrate," as recited in claim 1, the preform 114 is not joined to the lower mold half 104 in the position shown in Figure 5. Moreover, Budinski does not disclose that this heating causes the glass material of the preform 114 to flow into recesses of the lower mold half 104. Rather, Budinski discloses that the preform 114 is then pressed between the upper mold half 102 and

the lower mold half 104 "causing the preform 114 to deform and flow generally radially outward as depicted in FIG. 7" (column 4, lines 42-45). That is, the upper mold half 102 must press the preform 114 (alleged "second substrate") to cause the glass to flow into the cavities 110 of the lower mold half 104. Thus, the pressing force applied by the separate upper mold half 102 causes the glass material to flow into the cavities of the alleged "first substrate" in Budinski's method. Therefore, because Budinski fails to disclose each and every feature recited in claim 1, claim 1 is not anticipated by Budinski.

Dependent claims 6, 8, 9, 11, 12, 15, 19 and 20 also are patentable over Budinski for at least the same reasons as claim 1.

Therefore, withdrawal of the rejection is respectfully requested.

Fourth Rejection Under 35 U.S.C. §102

Claims 1, 11, 15 and 18-20 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,385,997 to Nelson et al. ("Nelson"). The reasons for the rejection are stated on pages 8-9 of the Official Action. The rejection is respectfully traversed.

The present application is a U.S. national stage application of International Application No. PCT/EP00/11688, filed on November 23, 2000, and claims foreign priority to German Application No. 199 56 654.2, filed on November 25, 1999. Nelson has a U.S. filing date of May 12, 2000. Accordingly, because the foreign priority date of the present application antedates Nelson's U.S. filing date, Nelson does not qualify as a reference against the present application under 35 U.S.C. § 102(e).

Therefore, withdrawal of the rejection is respectfully requested.

New Claim

Claim 39 depends from claim 1 and recites that "the joined second substrate includes a free upper side which is turned away from said first substrate during the flow of the glass into the recesses of said structured surface of said first substrate" (emphasis added). In other words, in the claimed embodiment, the free upper side of the second substrate is not in contact with another surface during flow of the glass. In contrast, Budinski's preform 114 is pressed by the upper mold half during flow of the glass. Accordingly, claim 39 further patentably distinguishes over Budinski.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this Amendment, the Examiner is respectfully requested to call Applicants' undersigned representative at the number given below.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: August 17, 2004

By: _____
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Pyrex® Borosilicate Glass

All Pyrex®, Quickfit®, SVL®, Rotaflo® and Springham® brand products listed in this catalogue are manufactured from borosilicate glass (unless otherwise specified). A large proportion of E-Mil® and MBL® volumetric ware is also made from borosilicate glass.

Standards

Pyrex® is a borosilicate glass which meets the specifications of the following standards:

BS ISO 3585, DIN 12217	Type 3.3 borosilicate glass
ASTM E-438	Type 1 class A borosilicate glass
US Pharmacopoeia	Type 1 borosilicate glass
European Pharmacopoeia	Type 1 glass

Chemical Composition

Pyrex® glass has the following typical composition (percentage by weight):

SiO2	=	80.6%
B2O3	=	13.0%
Na2O	=	4.0%
Al2O3	=	2.3%

Physical Properties

Coefficient of Expansion (20°C – 300°C)	3.3 x 10-6 K-1
Density	2.23 g/cm3
Refractive index (Sodium D line)	1.474
Dielectric Constant (1MHz,20°C)	4.6
Specific heat (20°C)	750J/kg°C
Thermal conductivity (20°C)	1.14W/m°C
Poisson's Ratio (25°C – 400°C)	0.2
Young's Modulus (25°C)	6400 kg/mm2

Chemical Resistance

Pyrex® borosilicate glass has a very high resistance to attack from water, acids, salt solutions, halogens and organic solvents. It also has a moderate resistance to alkaline solutions. Only hydrofluoric acid, hot concentrated phosphoric acid and strong alkaline solutions cause appreciable corrosion of the glass.

Hydrolytic Resistance

For many applications it is important that laboratory glassware has a high hydrolytical resistance; eg during sterilisation procedures, where repeated exposure to water vapour at high temperatures can leach out alkali ions. Pyrex® borosilicate glass has a relatively low alkali content and consequently a high resistance to attack by water. It meets the following standards (determined by the glass grain method).

Hydrolytic resistance according to ISO 719 (98°C) – class 1
Hydrolytic resistance according to ISO 720 (121°C) – class 1

Acid Resistance

Glasses rich in silica are less likely to be attacked by acids. Pyrex® borosilicate glass has approximately 80% silica and is exceptionally resistant to acids (except hot concentrated phosphoric acid and hydrofluoric acid). The acid resistance of Pyrex® borosilicate glass meets the requirements of ISO 1776 and class 1 requirements of DIN 12116.

Alkali Resistance

Alkaline solutions attack all glasses and Pyrex® borosilicate glass can be classified as reasonably resistant. The alkali resistance of Pyrex® borosilicate glass meets class 2 requirements as defined by ISO 695 and DIN 52322.

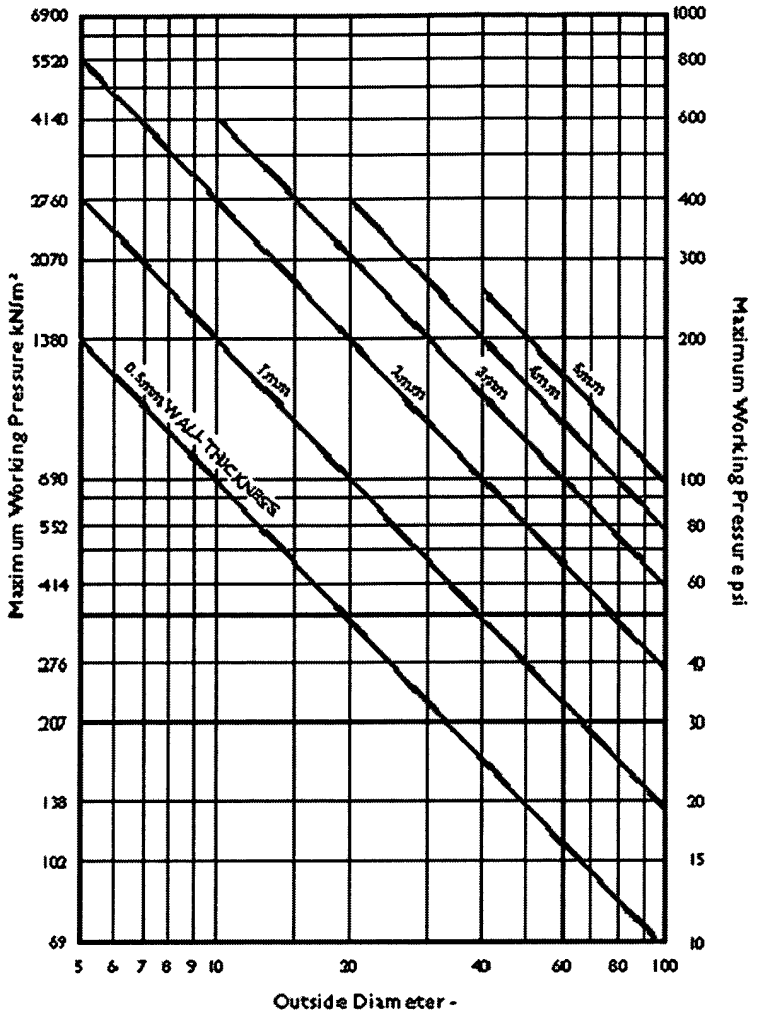
Temperature Resistance

Pyrex® borosilicate glass has excellent thermal properties due to its high softening point and low coefficient of expansion (3.3 x 10-6 K-1). The maximum recommended working temperature for glassware manufactured from Pyrex® borosilicate glass is 500°C (for short periods of time only). Special care should be taken at temperatures above 150°C to ensure that both heating and cooling are achieved in a slow and uniform manner (see "Care and Maintenance of Laboratory Glassware" section).

Pressure Data

Glass is a brittle material and can break when subjected to strong mechanical forces. As working conditions can vary enormously, Bibby Sterilin cannot guarantee glassware against breakage when used under conditions of vacuum or pressure.

The use of positive pressures within glassware is particularly hazardous and should be avoided if at all possible. If pressure work is unavoidable, the user is advised to consult the graph below which indicates the maximum working pressure for Pyrex® borosilicate glass tubing of various diameters and wall thicknesses.



The values shown are based on the formula:

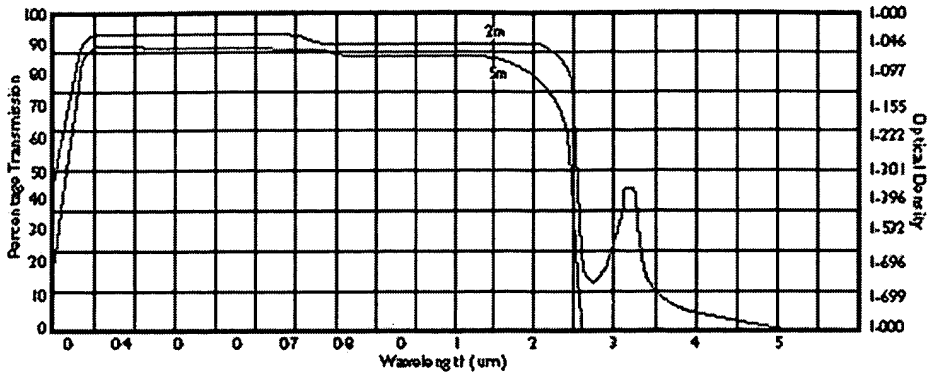
$$P = \frac{13790t}{D}$$

P	=	Maximum working pressure in kN/m2
t	=	Wall thickness, mm
D	=	Outside diameter, mm

The formula incorporates a value of 6895 kN/m2 for the maximum permissible tensile stress in the glass surface.

Note:
i) The maximum working pressure only applies at 25°C and for glass not subject to a temperature gradient.
ii) Assumes glass is free from scratches, chips or cracks.
iii) Assumes glass is freely supported and not subjected to clamping forces.
iv) The maximum working pressures do NOT apply to cylindrical tubes with flat bottoms.
v) Safety precautions should always be taken to protect personnel when conducting pressure work.
vi) See the "Care and Maintenance of Laboratory Glassware" section for advice.

Optical Data



Pyrex® borosilicate glass has the ability to transmit light through the visible range of the spectrum and can be used effectively in the near ultra-violet range, making it ideally suitable for work in the field of photochemistry.

The graph above shows the degree of transmission of light as a function of wavelength in the ultra-violet, visible and infra-red sectors of the spectrum, for the thickness of glass generally encountered in laboratory ware (up to 5mm).

Refractive index (Sodium D line)	=	1.474
Visible light transmission, 2mm thick glass	=	92%
Visible light transmission, 5mm thick glass	=	91%

Data For Glassblowers

Glassblowers may find the following information useful:

Working point	=	1252°C
Softening point	=	821°C
Annealing point	=	565°C
Strain point	=	510°C